

said second angled layer has a thickness in a range of from 0.04 to 0.1 mm;

said shaft has a small-diameter end and a large-diameter end;

said first angled layer has a first thickness near said small-diameter end of said shaft;

said first angled layer has a second thickness near said large-diameter end of said shaft;

said first thickness is substantially twice said second thickness; and

said layers are effective to provide said shaft with a torsional strength of at least $120 \text{ kgf} \times \text{m} \times \text{degrees}$ and a weight of from 30 - 40 g.

REMARKS

Claims 1-18 pending.

Claims 1-18 stand rejected.

Claim 1 is amended.

Claim 21 is added.

Claim 1 is amended to more clearly define the subject matter of the present invention. Support for the amendment to claim 1 is found, for example, at lines 13-14 of page 5. Claim 21 corresponds to canceled claim 19, as claim 19 was improperly withdrawn as being drawn to a non-elected invention. No new matter is added.

The present invention is a shaft for light weight golf clubs having alternating layers of straight and angled fibers which is 35-50 percent lighter than conventional shafts while providing the same outer diameter and the same

characteristics as conventional shafts such as flexural rigidity, flexural strength, torsional rigidity, torsional strength and crushing strength.

Claim rejections - 35 U.S.C. §103

Claims 1-2, 5-6, 9-10, 13-14 and 18 stand rejected under 35 U.S.C. § 103 as being unpatentable over JP 6-114131 in view of Kusumoto and Jackson..

In order to establish a case of *prima facie* obviousness, three criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally the prior art reference(s) must teach or suggest all the claim limitations. MPEP §2142.

Applicants respectfully submit that the combination of references as proposed by the Examiner, taken for all that the references disclose and fairly suggest, does not teach or suggest all of the claim limitations of the present invention. More specifically, it is Applicants' position that the cited references neither teach nor fairly suggest a four-layer structure in which the layers are arranged in concentric circles. Furthermore, it is Applicants' position that the cited references neither teach nor fairly suggest such a four layer structure, wherein the angled layers are formed by bonding two separate layers together. The first of these layers having fibers being oriented at a first angle relative to the axial direction of the shaft, and the second of these layers having fibers being oriented at a second, opposite angle relative to the axial direction of the shaft.

It is the Applicants' position that the golf club shaft structure as instantly claimed is neither anticipated nor rendered obvious by the cited prior art. Clearly,

by comparing Figs. 1-8 of JP'131 to Fig. 1(b) of the instant application, the unobvious differences between the instant claims, and what is fairly taught by JP'131 are easily appreciated.

The JP'131 reference clearly teaches wrapping a four-layer laminate over a central golf club shaft core material. The instant claims require that the four layers be arranged substantially concentric about the core. The Figures of JP'131, especially Fig. 8, clearly show that the four-layer laminate is simply wrapped around the core, resulting in spirally formed layers rather than substantially concentric layers. C

Furthermore, claim 1 and 21, as amended, require that the angled layers be formed by bonding two separate layers together. The first of these layers having fibers being oriented at a first angle relative to the axial direction of the shaft, and the second of these layers having fibers being oriented at a second, opposite angle relative to the axial direction of the shaft. There is neither any teaching nor any fair suggestion in the cited art which would render obvious the instant invention.

Therefore, Applicants respectfully submit that the cited references, taken for all then fairly teach one of ordinary skill in the art, neither teach nor fairly suggest the golf club shaft as instantly claimed in amended claim 1 or newly added claim 21. Consequently, the present invention as claimed in independent claims 1 and 21 is nonobvious in light of the cited references.

Applicants respectfully submit that if an independent claim is nonobvious under 35 U.S.C. § 103, then any claim depending therefrom is nonobvious. MPEP § 2143.03. Dependent claims 2, 5, 6, 9, 10, 13, 14 and 18 being dependent upon and further limiting independent claim 1, should also be allowable for that reason, as well as for the additional recitations each contain.

For the reasons stated above, Applicants respectfully request reconsideration and withdrawal of the rejection of claims 1, 2, 5, 6, 9, 10, 13, 14 and 18 as being unpatentable under 35 U.S.C. § 103(a).

Claims 3-4, 11-12 and 15-16 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over JP'131 in view of Kusumoto and Jackson as applied to claims 1-2, 5-6, 9-10, 13-14 and 18 above, further in view of Hedrick and Cheng.

Applicants respectfully submit that the Hedrick and Cheng references both fail to overcome the deficiencies of the primary reference, with respect to claims 1 and 21, as noted above. Therefore, if an independent claim is nonobvious under 35 U.S.C. § 103, then any claim depending therefrom is nonobvious. MPEP § 2143.03. Dependent claims 3, 4, 7, 8, 11, 12, 15 and 16 being dependent upon and further limiting independent claim 1, should also be allowable for that reason, as well as for the additional recitations each contain.

Claim 17 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over JP'131 in view of Kusumoto and Jackson as applied to claims 1-2, 5-6, 9-10, 13-14 and 18 above, and further in view of Cecka.

Applicants respectfully submit that the Cecka reference fails to overcome the deficiencies of the primary reference, with respect to claim 1, as noted above. Therefore, if an independent claim is nonobvious under 35 U.S.C. § 103, then any claim depending therefrom is nonobvious. MPEP § 2143.03. Dependent claim 17 being dependent upon and further limiting independent claim 1, should also be allowable for that reason, as well as for the additional recitations it contains.

For the totality of the reasons described above, Applicants respectfully submit that the claims, as amended, place the application in condition for allowance. Reconsideration and withdrawal of the outstanding rejections under 35 USC 103(a) is respectfully requested.

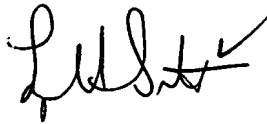
Conclusion

In view of the foregoing, the application is now believed to be in proper form for allowance. Early notice to that end is earnestly solicited.

The Commissioner is hereby authorized to charge payment of any additional fees associated with this communication, or credit any overpayment, to Deposit Account No. 13-4550.

If the Examiner believes that a telephone conference would be of value, he is requested to call the undersigned counsel at the number listed below.

Respectfully Submitted,



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Attached : Marked-up copy of claim 1, as amended.

Marked-up copy of claim 1, as amended:

1. (Thrice amended) A light-weight golf club shaft comprising, sequentially:
 - a first angled layer;
 - a first straight layer formed on said first angled layer;
 - a second angled layer formed on said first straight layer;
 - a second straight layer formed on said second angled layer;
 - said first angled layer, said first straight layer, said second angled layer, said second straight layer being arranged substantially concentrically about a central portion of said golf club shaft;
 - said shaft having a length along a longitudinal direction;
 - each of said layers extend over said length of said shaft and include fiber-reinforced composite material, said fiber-reinforced composite material containing reinforcing fibers;
 - said first angled layer and said second angled layer each being formed by bonding a first layer and a second layer, said first layer having reinforcing fibers oriented at a first angle relative to an axial direction of said shaft and said second layer having reinforcing fibers oriented at a second opposite angle, relative to an axial direction of said shaft;
 - said reinforcing fibers of said second angled layer being oriented at an angle relative to said longitudinal direction of said shaft; and
 - said second angled layer having at least one of said angle and a thickness effective to provide said shaft with a torsional strength of at least 120 kgf×m×degrees and a weight of from 30 to 40 g.